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ABSTRACT

New science teachers may be retained using a multifaceted approach. This paper presents three approaches to teacher recruitment. First, school districts may use an on-site training program--modeled after a medical doctor's residency--to induct new science teachers. Second, schools may arrange the master schedule to support new teachers by reducing the number of different preps and establishing common planning time with a veteran teacher. Finally, veteran science teachers may individually take responsibility for helping new teachers succeed through their daily actions in mentoring and supporting those teachers. (Author/YDS)

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Three Approaches to Retaining Science Teachers: How a District, School, and Individual Teacher Can Help

Jennifer L. Fong

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Bright-eyed and enthusiastic, new high school science teachers in urban school districts are often hired at the last minute on emergency credentials. Most have no teaching experience, nor have they completed any teacher credentialing course work. Assigned the worst classes and given multiple preps, new science teachers are often alone, without the support of a veteran teacher. When it comes time to plan lessons and find lab equipment, they spend a lot of time reinventing the wheel, trying to locate basic resources. The result? A burned-out science teacher who quits teaching within five years of entering the profession.

There is a different way. School districts, schools, and individuals can each approach science teacher recruitment and retention from their own perspectives. In this chapter, I discuss examples of programs that educators on each level can use. In each case, the programs rely on building a relationship between new and veteran teachers and giving new teachers both a time to reflect on their practices and a person with whom to reflect. While these approaches actively support the *new* teacher, helping them to grow as professionals, each approach also results in a positive experience for the veteran teacher. Thus, the veteran teacher also avoids burnout and is encouraged to take on leadership positions within the school, which is critical to science teacher renewal.

What a School District Can Do

In 1998–99, the Graduate School of Education (GSE) at the University of California at Berkeley (UCB), the San Francisco Unified School District (SFUSD), and Lawrence Berkeley National Laboratory (LBNL) collaborated on a pilot project called Scien-

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tist-to-Teacher (later renamed REPLICATE). Scientist-to-Teacher was designed to induct new science teachers into the profession, using an on-site training and mentoring program (Garcia and Harris 1998). The essence of the program was to pair two new science teachers with a veteran science teacher at the same school and encourage reflective inquiry on the part of all three. Thus, the veteran, or master practitioner, becomes responsible for the training and success of the new teachers.

The name, Scientist-to-Teacher, came from the program's idea to recruit scientists from industry, train them to become teachers on-the-job, and support them with a mentor teacher on-site by releasing both the new teacher and master practitioner for one period each day. A medical doctor training model was used. Just as first-time doctors (interns) are trained in hospitals by experienced doctors, the new science teachers were trained in the school by the veteran teachers. Anecdotal evidence from the initial twelve pilot teachers indicated that new teachers felt supported and confident about their teaching (Diehl et al. 2000). I served as the lead master practitioner for the San Francisco Unified School District (SFUSD), helping to coordinate with UCB. UCB's role was to hire a director to run the pilot program. The director made the contacts with SFUSD and helped the schools set up the master practitioner-intern relationships.

Unlike preservice teacher credentialing programs, Scientist-to-Teacher was designed to credential teachers as they taught full-time. Other inservice teacher intern programs exist between a school district and a local university; in these, teachers teach full-time on an emergency credential while taking course work for a regular teaching credential. Scientist-to-Teacher added a unique piece to this inservice training: on-the-job training and mentoring for one period per day, not just student teaching. Two interns and one master practitioner were released 0.2 FTE for the interns to learn on-the-job from the master practitioner (total of 0.6 FTE). (FTE means "full-time equivalency." A 1.0 FTE is 100 percent full time, which means teaching five periods. Since the interns were released 0.2 FTE they were released 20 percent of full time or one teaching period.) The master schedule assigned the same planning period to all three teachers (see Figure 1). In their meetings the interns and veteran teacher followed a syllabus, similar to that of a methods class, and discussed teaching techniques, assessing students, and adapting lessons, using the California Standards for the Teaching Profession to guide growth, observation, and reflection. Twelve SFUSD teachers participated (eight as interns, four as master practitioners); six of the eight interns were still teaching four years later.

Figure 1. District Level—Example of Teachers' Schedules Using Scientist-to-Teacher Model*

Period	1	2	3	4	5	6	7
Intern #1	Biology	Biology	Prep	Physiology	Biology	Prep	S-to-T meeting
Intern #2	Prep	Chemistry	Chemistry	Prep	Physical science	Physical science	S-to-T meeting
Master practitioner	Biotech-nology	Prep	Biology	Biology	Prep	Biology	S-to-T meeting

*Assuming a standard schedule has five classes and two prep periods.

Another feature of this model was recruiting people from industry to a secondary school teaching career. Naturally, such a move represented a significant career change. Not only were industry scientists being asked to give up higher paying jobs; many people in their position would object to losing a year's salary to take credential course work to enter a profession that pays significantly less than their former profession. The latter factor was mitigated by the fact that in the Scientist-to-Teacher program, new science teachers could immediately make the transition from industry to teaching without having to take time off for schooling.

Another critical component was the on-site relationship between the master practitioner and the intern. Scientist-to-Teacher interns were expected to observe master practitioners' classrooms and to participate with the master practitioner in lesson planning and preparation for laboratories and demonstrations. Therefore, interns benefited from all of the experiences of the master practitioners, who modeled excellent teaching and lesson preparation and offered advice about interns' teaching. The interns learned systems for record keeping, grading, and storing laboratory materials. Evaluative data indicate that interns found their daily meetings with other interns and master practitioners critical to their support system; the meetings provided opportunities to complain, to vent, and to share successes. In the following year without the release time, the interns, who were now second-year teachers, said they felt more isolated and less supported than they had felt the year before. In addition, the master practitioners said they felt a greater sense of commitment to the profession, and they subsequently took on more leadership roles at their schools.

Because it was a pilot project, Scientist-to-Teacher did not actually credential any teachers. The collaboration between SFUSD and UCB consisted primarily of arranging for release time on-site and weekly meetings of all teachers to discuss issues relevant to a teacher induction program. The curriculum was not formalized, although there were plans to seek accreditation and additional funding. A full program was expected to include two or three summers of credential course work, as well as two weekly after-school courses per semester, and, of course, the release times (which

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would substitute for the "observation," "methods," and "student-teaching" components of a traditional credentialing program).

A school district may consider using a "release time" model for both interns and master practitioner as used in the Scientist-to-Teacher pilot, either as a component of an intern credential program or as part of a beginning teacher–mentor teacher program. There is a considerable investment of time (0.6 FTE per site) and money, but districts would eventually save money by producing science teachers who were better prepared and could be expected to stay in teaching longer. The Scientist-to-Teacher project was supported in its development year by an Arthur Vining Davis Foundations Grant. Support for ongoing development of REPLICATE was provided through the Stuart Foundation.

What a School Can Do

A second approach to retaining teachers can be implemented on a school level, without any additional funding. Using the master schedule as an asset, a school can support and retain new science teachers. Historically, new teachers are given the worst schedules because the veterans usually get priority in choosing which classes to teach. Thus, new teachers usually get ninth graders, frequently the most difficult group in terms of classroom management. New teachers also get two to three preparations, while veteran teachers are assigned only one or two preparations. New teachers might also be given the chore of rotating from room to room, while veterans teach all five classes in the same space. Mission High School in San Francisco, where I have been a science teacher and an administrator for six years, has been actively trying to retain new teachers using the master schedule as a tool. Whenever possible, new teachers are given five classes of the same subject (only one preparation), or, at most, a mixture of two different subjects (two preparations), if the second course has a clearly developed curriculum. New teachers are already overwhelmed just teaching one subject; giving them three different subjects to teach is a recipe for burnout. They spend so much time preparing for their next subject that they have little time to reflect on what was successful in their first subject. One preparation allows time to focus on refining and improving a lesson—even within one day of teaching the same lesson multiple times.

Common planning periods may also be used, so both the new teacher and a veteran teacher teaching the same subject can meet several times a week during the school day (see Figure 2). If a teacher's day consists of seven periods, five are spent teaching, one is a preparation period, and the other is common planning time (CPT). The new teacher has a designated time to meet with the veteran teacher for advice with lesson planning, dealing with students, or testing experiments ahead of time. CPT can provide a source of support for the new teacher and reduce his or her feeling of isolation. During CPT, new and veteran teachers discuss their students, reflecting on successes and failures.

Figure 2. School Level—Manipulating the Master Schedule to Create Common Planning Time (CPT)*

Period	1	2	3	4	5	6[a]	7
New teacher	Biology	Biology	Prep	Physiology	Biology	CPT/Prep	Physiology
Veteran	Biology	Prep	Biology	Biology	Health	CPT/Prep	Biology

*Assuming a standard schedule has five classes and two prep periods.
Note: The new teacher has only two different kinds of courses (biology and physiology) while the veteran teacher has three different kinds, one of which is the same as the new teacher.
[a]During 6th period, the new and veteran teachers can meet to plan lessons.

This model has a positive impact on collegiality in a department, as two teachers have time to meet and get to know one another. It creates a support system for both, whether their concerns are related to teaching or to their personal lives. Teacher applicants who are considering offers from different school sites are often attracted to this model because they recognize that they will be supported during their first year of teaching.

What an Individual Can Do

Finally, individual, veteran teachers can welcome and support new teachers. We know that, unfortunately, some veteran teachers discourage new teachers without meaning to. Some veterans are resistant to change and are dismissive of new teaching methods that new teachers are trying. Their attitudes are pessimistic about students, teachers' salaries, and education in general. Some veterans will ask a new teacher why he or she chose teaching instead of a more lucrative career, thus creating a negative atmosphere within a science department. Furthermore, some veteran teachers are reluctant to share their laboratory experiments and materials with newer teachers who, because of their inexperience, may be unable to properly care for the supplies—thus forcing new teachers to have to create their own inventory of experiments and materials.

However, there are also many veteran teachers who actively support their newer colleagues. Veteran science teachers who had a supportive mentor when they entered the profession often feel the need to play the same role for a new teacher. Sometimes a veteran teacher who did not have a mentor recognizes what a help a mentor might have been and so decides to take on this role for a new teacher. For whatever reason the veteran teacher becomes a mentor, the school and the district need to support that teacher, either with a stipend or a release day and substitute teacher for the veteran or new teacher to observe the other.

Veteran teachers can share equipment, lab materials, and lesson plans; they can also open their classrooms for the new teacher to observe and gain ideas. It is critical for veterans to make themselves available to the new teachers with little judgment or bias.

Finally, if individual teachers feel they have the responsibility to help induct a new person into the profession, they will usually pass on to this new teacher a feeling of responsibility for the next generation of teachers. When the new teacher becomes a "veteran" in three to five years, he or she will feel a responsibility to look after a new teacher, and a cycle of learning is created. Teaching becomes a profession in which the training of new members is a responsibility all teachers must assume.

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